in the Syllæ and the other little Nereids which have been the subject of my investigations, I have never perceived any peculiar organ from which the light appeared to emanate. The muscles alone, and particularly the muscles of the feet, have appeared to me to present this phænomenon. I have seen, moreover, some Syllæ for instance shine through the whole extent of their bodies; and in this case the comparison to a thread of burning sulphur is striking and just. This is the appearance to the naked eye; but under the magnifying glass this thread is divided into a double range of luminous points corresponding to the feet.

I am far from denying that certain animals may have organs charged with secreting light, as certain fishes possess those for secreting electricity; but up to this time I have never seen that sparkling light show itself except in the muscles and at the moment of contraction. There may undoubtedly exist on this point reasonable uncertainty with regard to those Annelids whose foot-muscles are lodged in the abdomen; but this cannot be true with respect to the *Ophiura,* and nothing is easier than to prove this even to the unaided vision, as in the latter the phosphorescence appears along the arm, and only during movement. Moreover, the details which will be given beyond of the phosphorescence of the *Noctilucæ* will show plainly, I believe, that these animals have no special organ for producing the light.

Finally, the *Photocharis* observed by Ehrenberg secreted a liquid which left luminous traces on the objects which came in contact with it. This peculiarity I have also met with in one of my Annelids; but generally in the latter, and especially also in the *Ophiura,* the light was owing entirely to the scintillations, and disappeared with them. It is, however, easy to believe that the modes of phosphorescence which we have admitted may coexist in the same animal.

[To be continued.]

VII.—*On the Structure of the Leaves of Palms.*

By M. A. Trécul*.

Notwithstanding the important investigations of Von Mohl and Mirbel, there still remains considerable uncertainty upon the structure of the leaf in the Palms. For instance, what is the ligula of the flabelliform leaves of many of these plants? Are their lobes the natural divisions of the leaf, or only accidental rents of its substances? Both these opinions are advanced. How is the plaited limb of these leaves formed? Are the pin-

* From the Comptes Rendus, May 16, 1853, p. 857.

nules of the pinnate leaves formed like those of dicotyledonous plants? I do not hesitate to say at once, that the phænomenon is very different, and that the origin of the ligula is by no means that which has been supposed by very celebrated anatomists.

In examining palms with pinnate leaves, one of the leaves of which is just expanding, it will be seen that the old leaves have the pinnules distant from each other on the rachis and free at their extremities, whilst that which is just emerging from its enclosing sheath presents a very singular appearance. The elongation of the rachis removes the pinnules from one another, but they are all joined together at the apex; sometimes they are united in this manner by a cellulo-fibrous thread which even contains vessels (I have seen spiral and streaked vessels in the threads of *Phœnix sylvestris*), and which extends from the base of the limb to its apex. The sheath of this leaf encloses another, all the leaflets of which are frequently so compressed together, that they appear to form a single piece without any parts distinguishable by the naked eye; in other cases in which the compression is less, all the parts of the leaf are apparent.

What is the mode of formation of these leaflets, so singularly attached to one another?

In examining a *Chamædorea Martiana* we find that in this leaf in which all the parts are pressed together, the upper leaflets are much longer than the lower ones. In a leaf of 16 centimetres (about $6\frac{1}{2}$ inches) in length, the upper pinnules were 13 centimetres (about $5\frac{1}{4}$ inches) long, whilst the lower were only 3 millimetres (about $\frac{1}{8}$ inch), and this disproportion may increase when the apex of the leaf becomes extended. In this leaf there were thirteen pinnules on each side of a rachis of 2 centimetres (about $\frac{4}{5}$ inch) in length, and the two rows being placed on the inner surface, the back of the rachis only could be seen.

A few millimetres below the lower leaflets is the opening of the sheath. If this be removed, a very remarkable conical body is exposed. Extracted from a leaf of 16 centimetres in length, it measured $3\frac{1}{2}$ millimetres. This is also a leaf, which when viewed from behind presents an entire surface, but in front is divided into two portions; the lower portion is cylindrical and notched at the apex at the opening of the sheath; the upper portion, which is conical, is divided longitudinally on the inner surface into two rolls, which diverge towards the base and become attenuated towards the apex. These are the two rows of leaflets in course of formation. Each roll is transversely striated on the sides, and the striæ or furrows of one side of the roll alternating with those of the other side of the same render the longitudinal ridges sinuous.

By opening the sheath of this leaf I obtained another which

was about $1\frac{1}{4}$ millimetre in length. Its two rolls (or series of leaflets), a little less advanced than those of the preceding leaf, were comparatively more divergent at the base. From the sheath of this leaf issued the apex of a still younger one not more than $\frac{2}{3}$ millimetre in length. Its lateral rolls were only marked with faint striæ or transverse depressions towards the middle, and its sheath also gave exit to the tip of another leaf. This latter was not more than $\frac{1}{4}$ millimetre in length; its sheath, which was short and thick, had a broad rounded opening about the middle of the leaf, through which the naked apex of the stalk could be seen. This sheath was surmounted by the nascent rachis, but this presented no trace of leaflets. It was broad and depressed in its median portion; and there was on each side a longitudinal swelling of so little prominence that it required considerable attention to perceive it at all. These swellings are the origin of the two rows of leaflets.

Thus a leaf of *Chamædorea Martiana* commences with a simple circular cushion at the apex of the stalk. This cushion or rudimentary sheath is produced obliquely into a prominence, which is depressed on its inner surface. This becoming elongated into a cone produces a longitudinal roll on each of its margins. These two rolls or cushions, which are more inflated near the sheath, where however they terminate in a short point, become more and more contracted towards the apex of the rachis. Originally they are smooth, but during their growth scarcely sensible undulations are produced on each side of them (first on the inner side); of these the first appear a little way from the base of each roll, and they afterwards increase in number and attain the base and apex of the rachis.

Whilst all the parts of the leaf continue growing, these undulations, increasing in depth, become furrows which penetrate by degrees into the interior of the roll, at length arriving at the opposite side on the outer surface so as to produce a rupture; but the furrows which penetrate from the outer surface towards the inner cease advancing before reaching the latter, so that scission takes place only at the sides of the outer surface. In this manner are produced as many leaflets plaited in the direction of their median nervure as there were ribs on the inner surface; but the separation of the leaflets is not completed in this manner through their entire length; it stops near the apex, which remains united to the side of the leaflet placed above it. When the leaf emerges from its sheath and the leaflet expands, this point of attachment becomes broken and the apices of the leaflets are set free. The union of the leaflets is not the same throughout the palms; in *Phœnix sylvestris*, *Acrocomia sclerocarpa*, &c., the points of the pinnules are attached to a cellulo-

fibrous thread which runs along the whole length of the leaf, and retains the leaflets in union for some time after their expansion. This filament and the brown pellicles which cover the leaves at this period have a similar origin. They arise from an envelope, within which the leaflets are organized, and which becomes dried up and falls in small brown flakes. The existence of this envelope may be recognized in the very young leaves, even at the period when the furrows (as in the *Chamædorea*) begin to make their appearance. The leaflets then appear to be formed in a substance of a gelatinous appearance, which is the origin of this pellicle.

The leaflets of all palms are not plaited in the same direction; some, as *Chamædorea Martiana, Ceroxylon andicola, Areca rubra, Arenga saccharifera,* &c., have them folded on the lower surface; others, in which the scission is carried to the ridges of the inner surface and not to those of the outer, have the leaflets folded on the inner surface, as *Phœnix dactylifera, sylvestris, Fulchiron senegalensis,* &c. There are other palms of which the leaflets are broader and contain several folds of the primary lamina. It appears to me that very good characters may be derived from the plication of the leaflets.

The limb of the simple leaf of *Geonoma baculum* is somewhat differently developed; the rachis emits a lanceolate limb, widest at the base; this becomes plaited first at this basal portion, the folds extend in proportion to the growth of the leaf, and the upper extremity becomes cleft to form the two terminal lobes.

In *Chamærops humilis,* as in *Chamædorea* and plants with sheathing leaves, all the leaves are enclosed by their sheaths. In a leaf of 1 millimetre the sheath was equal to the half of the length of the leaf; it was opposite to an inflated portion covered with hairs, which is only the rudimentary limb. I removed all these hairs and with them a pellicle which clothed this part of the leaf. In this manner I arrived at a rounded surface, divided longitudinally into parallel ribs on the anterior and posterior surfaces of the limb. The surface being convex, the ribs are shorter on the sides than towards the middle. They are inserted on a nearly horizontal plane and rise parallel in growing. Each rib of the outer surface corresponds to the median nervure of a lobe of the leaf.

As long as the leaf remains enclosed in the sheath, all its parts consist of a very delicate tissue, but as soon as its apex reaches the air and light it becomes green, grows rapidly, and acquires consistence; the limb is often hard and coriaceous and contains much woody matter, whilst the base of the petiole, which is enclosed in the sheath, is still of extreme fragility. It is also this lower portion which continues growing longest. Thus the limb

of the leaf of *Chamærops humilis* is found under a pellicle clothed with hairs, which is torn at the junction of the petiole by the growth of the limb; and it is the base of the pellicle which gives rise to the organ which has been called the *ligula* of the flabelliform leaves of certain palms, and to the cicatrix which is observed round the extremity of the petiole.

PROCEEDINGS OF LEARNED SOCIETIES.

LINNÆAN SOCIETY.

June 1, 1852.—R. Brown, Esq., President, in the Chair.

Read a memoir "On *Acradenia*, a new genus of *Diosmeæ*." By Richard Kippist, Esq., Libr. L.S.

The new genus described was one of a highly interesting collection formed in the neighbourhood of Macquarrie Harbour, Van Diemen's Land, by Mr. Joseph Milligan, and by him, through the late lamented Mr. Bicheno, presented to the Society. It belongs to the natural order *Diosmeæ*, tribe *Boronieæ*, and in habit most nearly approaches *Zieria*, to the larger-leaved species of which it bears at first sight considerable resemblance. From this genus, however, as well as from *Melicope*, *Boronia*, and *Cyanothamnus*, from *Eriostemon*, *Crowea*, and *Philotheca*, and from *Geleznowia*, Turcz., it differs in various characters which are more particularly indicated; and it is distinguished from them all by the structure of its ovaries, which adhere closely together and are everywhere clothed with a dense tomentose covering; except that each bears, at its upper external angle, a naked sessile tubercle or gland, large enough to be readily observed with the naked eye, a character which Mr. Kippist has been unable to discover in any closely allied genus, and which has suggested the generic name. He is unable to speak positively as to the precise nature of these glandular bodies, or to say whether any exudation proceeds from them: when examined under the microscope they appear to be perforated by a tube, widening below, and communicating with the internal cavity of the carpel; and from their exact correspondence in position, they are probably analogous to the cornute appendages which crown the ovaries of some species of *Phebalium*, in which genus they are occasionally developed into subulate or nearly cylindrical horns.

ACRADENIA, *Kipp.*

Calyx 5-partitus. *Petala* 5, hypogyna, calyce multò longiora, æstivatione imbricata, ovato-elliptica, undique velutina. *Stamina* 10, hypogyna, petalis sublongiora, alterna paullò breviora; *filamenta* libera, subulata, glabra; *antheræ* introrsæ, glabræ, biloculares, rimâ longitudinali dehiscentes, apice inappendiculatæ. *Ovaria* 5, gynophoro disciformi margine sinuato insidentia, 1-locularia, villosissima; singula apice glandulâ majusculâ sessili instructa. *Ovula* in loculis gemina, suturæ ventrali collateraliter inserta, pendula. *Styli* in unicum glabrum coaliti.